Complex odontoma in the maxillary sinus
Report of 2 cases

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ABSTRACT – 2 cases of complex odontoma in the maxilla are presented with clinical, radiographic and histological findings. The tumors in both cases extended into the maxillary sinus and in addition, in both instances third molars were displaced by the tumor. One of the cases was associated with a dentigerous cyst.

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The most common type of odontogenic tumor in man is the odontoma. The term odontoma, first introduced by Broca, was originally applied to all odontogenic tumors. According to Pinborg et al. the term odontoma is now reserved for odontogenic malformations containing epithelial and mesenchymal components with complete differentiation. 3 groups of odontomas related to the clinical and histological differences were defined:

The ameloblastic fibro-odontoma, consisting of varying amounts of calcified dental tissue and dental papilla-like tissue, the latter component resembling an ameloblastic fibroma. The ameloblastic fibro-odontoma is regarded as an immature precursor of the complex odontoma which differentiates during life. Pinborg has suggested a subdivision of the ameloblastic fibro-odontoma into 2 groups; a more aggressive type in which the soft tissue component dominates and a very slow growing type dominated by hard tissue.

The complex odontoma, microscopically showing a disorganised irregular mass of dental tissues. Tooth-like structures are not found.

The compound odontoma, composed of all odontogenic tissues in an orderly pattern which results in many tooth-like structures, but without morphologic resemblance to normal teeth.

The purpose of this paper is to present 2 cases of complex odontoma with an uncommon location – the maxillary sinus. 1 of these tumors was surrounded by a dentigerous cyst.

Case reports

Case 1
A 21-year-old woman was referred for treatment of a slight swelling of the left side of her face. The swelling had been first noticed by the patient 2 months previously. She initially went to her dentist because of recurrent episodes of pain in this area. The dentist incised and drained a fluctuant area lateral to the left tuberosity. After this treatment the swelling subsided.
Fig. 1. Lateral radiograph of maxillary sinus revealing radiopaque mass and displaced molar, and showing the relationship of the displaced molar to the orbital floor.

Fig. 2. Anteroposterior radiograph illustrating the contact between tumor and nasal septum.

and the pain disappeared. The patient reported to us in no obvious discomfort and with minimal facial swelling.

Extraorally, she had tenderness in the left maxillary canine region. A firm non-fixed lymph node was present below the left angle in the anterior cervical chain.

Tenderness was also present intraorally lateral to the left tuberosity. The buccal bone appeared slightly expanded but the overlying mucosa was normal in texture and colour. The patient's maxillary left second molar was not present and she was unable to recall a previous extraction. The scar of the previously made incision in the mucosa distal to the first molar was observable.

A radiopaque irregular mass was found in the maxillary sinus during a routine radiography. This mass was approximately 3 cm in diameter, well-defined and extended forward to the first molar. A tooth, probably the third molar, was displaced superiorly to the level of the orbital floor (Fig. 1). The results of the physical examination and the patient's medical history, except for an elevated leucocyte count, were normal.

Under general anesthesia with naso-tracheal intubation, the maxillary left first molar was extracted because of extreme root resorption. A semilunar incision was made from the first premolar to the second molar region. The mucoperiosteal flap was reflected and a tumor, which penetrated the thin cortical bone, could be seen. The tumor had a lobulated surface and a white-yellow colour. The lesion was removed intact with the displaced tooth. The bone margins were smoothed and an opening was created through the medial wall of the sinus beneath the inferior turbinate. A rubber drain was inserted through this opening and after mobilisation of the oral mucosa, the incision was closed. The patient had normal postoperative swelling. The antrum was irrigated for 6 days until the irrigation fluid became clear. The healing was uneventful.

Macroscopically the tumor measured $3 \times 3 \times 4$ cm and weighed 17 g.

The microscopic examination of the calcified mass revealed mostly irregular dentine, cementum, enamel and spaces containing loose fibrous connective tissue. The thin fibrous capsule covering the tumor contained inflammatory cells with lymphocytes and plasma cells. The diagnosis was complex odontoma.

Case 2

A 17-year-old boy was seen with a swelling of the left cheek which had started one and a half years previously. The swelling had gradually enlarged but had caused no discomfort.

On extraoral examination it was found that the patient had a swelling of the soft tissues of the left cheek caused by a bulging of the left maxillary bone. The sensory nerve function was unaffected.

Intraorally, the maxillary left second and third molars were not present. The maxillary first left premolar had been extracted previously. The remaining teeth reacted normally to a pulp vitality test. The alveolar process in the left maxillary molar region was expanded and felt hard and bone-like. The covering mucosa was normal.
Radiography showed a large radiopaque mass that occupied the left maxillary sinus and caused resorption of the palatal and disto-buccal roots of the maxillary left first molar. The mass was approximately 4 cm in diameter, protruded through the medial antral wall and was in contact with the nasal septum (Fig. 2). The tumor appeared to be encapsulated and a tooth was displaced by the mass to the anterior sinus wall near the orbital floor (Fig. 3). The tomogram showed a radiolucency with well-defined borders surrounding the tumor (Fig. 4). On further questioning the patient did not raise a complaint of nasal airway obstruction. The patient’s medical history and the laboratory findings were normal except for a slight leucocytosis. Under general anesthesia, with naso-tracheal intubation, an incision was made from the maxillary left molar region to the lateral incisor. When the mucoperiostal flap was reflected, a blue-gray capsule was seen. After perforation of the cyst-like lesion, there was discharge of fluid. The first molar was extracted. The tumor and cyst were removed intact simultaneously with the displaced tooth. An opening was created in the medial sinus wall beneath the inferior turbinate prior to placement of a rubber drain. There was no perforation on the lateral nasal wall by the tumor. The incision was closed after mobilisation of the mucosa. The sinus was irrigated for 6 days. 4 days later a fistula had formed distally to the molar extraction socket. The sinus was again irrigated through this opening. 10 days later the oroantral communication closed.

Fig. 3. Lateral radiograph showing radiopaque mass and displaced molar.

Fig. 4. Lateral tomogram demonstrating the presence of a cyst-like lesion associated with the tumor (arrows).

Fig. 5. Photomicrograph showing detail of complex odontoma (CO) with enamel spaces and dentin. The capsule around the tumor is lined on the inner side by a layer of squamous epithelium (E). In the connective tissue (C) inflammatory cells are present. H&E × 70.
spontaneously. In the following postoperative visits there were no complications.

Macroscopically the tumor measured $5 \times 3 \times 4$ cm, and weighed 26 g.

Microscopic examination showed the soft tissue covering the tumor with a stratified squamous epithelium. The decalcified mass showed enamel, cementum and amorphous dentine with round and ovoid spaces containing pulp tissue (Fig. 5). The diagnosis was that of a complex odontoma with a dentigerous cyst.

Discussion

Complex odontomas represent 25% of all odontomas. Malformation is most frequently diagnosed during the second and third decades, with a mean age 20.6 years. The incidence in the premolar-molar region of the maxilla is about 20%.

These tumors seem to occur in both sexes equally; however, some reports show a predilection for females or males.

Like most odontogenic tumors the cause of odontoma is not known. Hitchin suggested that odontomas are either inherited or are secondary to a mutation of or an interference with the genetic control of tooth development. Trauma, infection or growth pressure may be regarded as a source of disturbance to the genetic mechanism controlling tooth development and this may lead to an odontoma. It appears that odontomas develop from the enamel organ or the dental lamina of either a normal tooth, a supernumerary tooth, or in association with the follicle of an unerupted tooth. In the presented cases there was no history of trauma or infection. The absence of the second molars in both cases leads us to assume that tumors develop from the corresponding dental lamina. In both instances third molars were displaced by tumor.

Odontomas are generally asymptomatic and are usually discovered on routine dental X-rays. The most common symptoms observed are impacted teeth and swelling. In the present cases there was only the discomfort of swelling and the secondary infection. Odontomas are generally located within the dental arch. In rare instances they are found in the maxillary sinus or the subcondylar region. Both of our cases were partially located in the maxillary alveolar process and extended into the sinus. Odontomas usually grow slowly and after calcification may remain static for the rest of the patients life.

Generally the odontoma is surrounded by a fibrous capsule, but occasionally it may be seen in association with a dentigerous cyst. The cyst seems to develop from the enamel organ that gave rise to the odontoma. These odontomas are called cystic odontomas and represent a very small group of all odontogenic tumors. There are a limited number reported in the literature. Patient 2 illustrates a case of complex odontoma with such a cyst.

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References

10. GOGLIN, R. J., CHAUDHRY, A. P. & PINDBORG, J. J.: Odontogenic tumors. Classification, his-


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